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Effectiveness of Drug Abuse Treatment Programs

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The Treatment Research Reports and Monograph Series are issued by the Treatment Research and Assessment Branch, Division of Prevention and Treatment Development, National Institute on Drug Abuse (NIDA). Their primary purpose is to provide reports to the drug abuse treatment community on the service delivery and policy-oriented findings from Branch-sponsored studies, innovative service delivery models for different client populations, innovative treatment management and financing techniques, and treatment outcome studies.

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FOREWORD

This report is designed to provide concise, straightforward, and systematic information on the effectiveness of community-based drug abuse treatment to the reader who does not have a scientific background but nonetheless has a civic or professional interest in the provision of drug abuse treatment. It presents major findings from the more important studies of treatment outcomes of currently available modalities--methadone maintenance, therapeutic community, outpatient drug free, and detoxification--in a summary organized for easy reference. A major consideration in developing the report has been to highlight the more straightforward data presentations in the studies and minimize reliance on the kinds of data presentation which would require a statistical background to understand. Nonetheless, we believe that the essential information regarding treatment effectiveness is preserved in this report for those who will make the decisions regarding the provision of service delivery to drug abuse clients at the Federal, State, and local level. It is also hoped that the reader with a more technical background will find this report useful as well.

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INTRODUCTION

This report summarizes what is known regarding the effectiveness of drug abuse treatment in the United States. It is designed primarily to inform laymen and others who have a civic or working interest in the field but are not specialists in research on the results of treatment. Readers who wish to review the material at the specialist's level will find the supporting research literature cited extensively. The report focuses on findings available through 1980 that are likely to be widely applicable and provides historical perspective as well. While most of the studies cited here deal primarily with the treatment of heroin addicts, findings are also presented for samples which include other drug abusers. However, much of this literature gives major attention to the treatment of the heroin addict.

Professionals in the treatment of drug abuse have recognized the need to assess the results of their work, but the task is time consuming and complex. The many interrelated variables of human behavior and environment make data difficult to gather and analyze; the longer the followup period, the greater the difficulty. Still, more than enough evidence has accumulated by now to indicate that the methods of treatment commonly used beginning in the 1960s have been associated with significant behavioral change. Data are emerging also that show the comparative value of the various means of treatment for differing types of patients. These findings clearly demonstrate the significance of publicly funded programs. At the same time they provide guidelines for selecting and improving the forms of treatment best suited to the needs of an evolving population of drug abusers.

Approaches to Treatment

The most extensive and reliable data on the results of treatment relate to four approaches that came into use largely in the 1960s with the advent of large scale Federal support and emphasis on community-based programs. These are the approaches that will be covered in this report. They may vary in detail from program to program, but generally may be described as follows:

Therapeutic Communities: These are full-time, drug-free residential programs. Time in treatment may be scheduled for as little as 2 months, but most programs are considerably longer and often extend well beyond a year. Some 28 percent of clients completing NIDA-funded residential drug-free (primarily therapeutic community) programs in 1979 were in treatment for more than 52 weeks (18).

Therapeutic communites are highly organized and provide, for example, peer support and confrontation, counseling, and residential job functions. The basic goal is to persuade the patient to abandon antisocial and self-destructive behavior and pursue a mature and productive way of life.

Methadone Maintenance: This approach involves replacement of street heroin with methadone, a synthetic opiate intended to allow clients to stabilize themselves physiologically such that they can explore alternative ways of functioning. This modality is usually provided on an outpatient treatment basis. Daily methadone doses are necessary, but most programs provide for take-home methadone on weekends so that patients typically need visit the clinic only 5 days a week for medication. Time in treatment may vary considerably although the majority of clients who complete treatment stay in this treatment a year or more. Fifty-six percent of clients completing treatment in NIDA-funded methadone maintenance programs during 1979 were enrolled for more than 52 weeks (18). Methadone maintenance combined with rehabilitative counseling enables the patient to leave the drug-seeking street life in favor of a normal lifestyle. Detoxification from methadone and subsequent abstinence is usually seen as an eventual objective.

Outpatient Drug Free: This modality provides treatment for abusers of both opioids (i.e., natural or synthetic opiates such as heroin, illegal methadone, dilaudid, etc.) and nonopioid drugs (such as sedative-hypnotic drugs, tranquilizers, amphetamines and hallucinogens). Programs vary widely in duration, goals, and content. At one extreme, are highly organized programs operated as daytime therapeutic communities; at the other extreme, are more relaxed programs that offer conversational (rap) sessions, recreational activities, and help with personal

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problems on request. Some 58 percent of all clients completing treatment during 1979 in outpatient drug-free programs reporting through the Client Oriented Data Acquisition Process (CODAP) system were in treatment for 6 months or less. Only about 18 percent of those completing treatment were enrolled for more than 52 weeks (18).

Detoxification: This may be inpatient or outpatient treatment, but typically is outpatient. It is intended primarily to eliminate physiological dependence on heroin. Historically, detoxification programs have lasted as long as 6 months or more, but since 1974 detoxification involving methadone, by law, (Narcotics Addicts Treatment Act of 1974, P.L. 93-281) cannot exceed 21 days. Detoxification is considered a humane means of allowing patients to withdraw from heroin at least temporarily and bring some order into their lives, as well as attracting some patients into long-term treatment.

Measures of Effectiveness

The effectiveness of treatment logically should be measured in terms of the goals of the particular program. These may reasonably vary among programs, but drug abuse treatment has had three widely accepted outcome criteria: reduction in use of drugs; reduction of crime; and an increase in productive activity, such as holding a job, attending school, and homemaking.

These behavioral criteria are well developed and widely applicable. Evaluations based on them are the source of most of the evidence that publicly-funded, drug abuse treatment programs are working. The criteria can be used to assess behavior both during and after treatment. However, although evaluation during treatment can provide useful information, behavior after treatment is the acid test of any program and will be the focus here.

From a research point of view, it might be desirable to have studies making use of random assignment of clients to experimental groups (groups of clients receiving a particular form of treatment), and to control groups (groups receiving no treatment). In this way, we could see still more clearly whether the particular treatment form is alone responsible for any change in client behavior that took place. However, it is readily apparent that assignment of individuals to a no-treatment condition is neither possible nor appropriate in the real world of treatment programing. In that world, and in the studies presented below, the particular treatment outcome obtained is the result of the influence of treatment programing; of community variables (e.g., availability of jobs); and of the client's own characteristics (e.g., arrest history).

Some could argue that in the absence of such experimental designs, observed improvement in client functioning could well be "spontaneous remission" rather than an effect of treatment. However, the prudent person must take several considerations into account which would seem to rebut the "spontaneous remission" argument. First, spontaneous remission is a misnomer in the case of the person entering drug abuse treatment. Remission does occur, but with the aid of counseling, other treatment, and the support systems one finds in the family and community. A second consideration is that the studies described below in the section entitled "Early Findings of Treatment Effectiveness Research" observed high rates of relapse among clients treated in institutional facilities. If spontaneous remission occurs, it was not evident in these studies (except in the case of a minority of the clients reaching middle age). One could also examine the differential relapse rates for treatment modalities, especially in the case of outpatient detoxification programs. Finally, the prudent individual would argue that the often dramatic improvement observed in drug abuse treatment clients from admission to the posttreatment period are unlikely to have resulted from factors unrelated to the treatment intervention.

The studies reviewed here are the major efforts in terms of numbers of patients involved and influence on methods of treatment. However, the omission of one or another study does not imply that it is less valid or less reasonable in approach than those included.

Relatively few reports of research on the effects of drug abuse treatment in this country appeared before about 1970. Most studies involved opioid addicts who were treated at the U.S. Public Health Service Hospital in Lexington, Kentucky. Treatment included detoxification, treatment of medical and surgical problems, psychotherapy, vocational training, and

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maintenance of a drug-free therapeutic environment. These patients and the method of treatment, on the whole, were not typical of those that began to emerge in the 1960s; nevertheless, the investigators involved laid important groundwork for subsequent research, and their work will be covered here under "Early Findings." Reports published since about 1970 will be covered in "Contemporary Findings."

EARLY FINDINGS OF TREATMENT EFFECTIVENESS RESEARCH

About a dozen major followup studies on the effects of treatment had been conducted by 1965. All involved opioid addicts. O'Donnell (20) summarized the findings from these studies while recognizing the difficulty in so doing due to differences in investigative approach. O'Donnell reported that among detoxified patients, relapse was common and tended to occur soon after the patient was released from the institution. Even when relapse occurred, rates of abstinence tended to increase with the passage of time after treatment. In addition, higher abstinence rates were found among older patients. Nonvoluntary patients seemed to be abstinent more often than voluntary patients. The studies analyzed by O'Donnell included those by Hunt and Odoroff (14) and by Duvall et al. (10) which follow.

Hunt and Odoroff (14) studied some 1,900 opioid addicts released from treatment at Lexington between July 1952 and December 1955. All lived in the New York City area. Each was followed until he became readdicted or until December 31, 1956. Data were obtained on 1,881 patients. Of these, 90 percent were judged to be readdicted; 7 percent were judged to be abstinent; and 3 percent were using narcotics irregularly or their addiction status could not be determined. Followup periods ranged up to 4 and a half years, but in the majority of cases the classification of abstinence was as of a time shortly after discharge.

Duvall, Locke, and Brill (10) followed 453 of the Hunt and Odoroff patients for 5 years from the time of discharge for each patient. They found that more than 97 percent of the subjects became readdicted at some point during that period. However, while only 6 percent were voluntarily abstinent 6 months after discharge, the figure rose to 17 percent at 2 years and to 25 percent at 5 years. Duvall et al. found also that patients over 30 had significantly higher rates of abstinence during the 5 years than did their younger counterparts. Vaillant (39) investigated 100 of the subjects studied by Duvall et al. for up to 12 years; no surviving patient was followed for less than 4 years. He found that 90 percent returned to the use of opioids at some time during the followup period. Nevertheless, 46 percent were opioid free and living in the community at the time of death or last contact, and 30 percent had been abstinent for the previous 3 to 12 years. Vaillant's data showed in addition that abstinence was clearly correlated with previous compulsory supervision.

Between March 1961 and October 1963, O'Donnell (19,20,21) investigated 266 opioid addicts admitted to Lexington during 1936-59. For the 118 subjects interviewed, the average time from first admission until the interview was 11 years. Information on 144 deceased subjects was obtained from records and informants.

In this study O'Donnell departed from the then common practice of classifying subjects as either addicted or nonaddicted. He had seen that, as time passed, individuals tended to shift from one status to another with frequent periods of abstinence, sometimes quite long. A patient's post-hospital history, therefore, would be a more realistic measure of success than his status at the time of death or interview. Thus, O'Donnell set up graduated classifications: institutionalized; addicted to opioids; alcoholic or addicted to barbiturates; occasional use of opioids, barbiturates, or alcohol to excess; abstinent; and unknown. Addicted was defined as use of opioids at least once daily for at least 2 weeks.

On the foregoing basis, 43 percent of the living subjects were abstinent at the time of interview. Post-hospital history was based on total person hours lived by the 266 subjects from first admission to the time of death or interview. Some 23 percent of these person hours were spent completely abstinent. Looked at another way, 73 percent of the men and 62 percent of the women relapsed to opioids, but 38 percent of the men and 79 percent of the women had some period of complete abstinence during the followup period.

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Thus, the available studies of treatment effectiveness accomplished for the pre-1970 period had two major findings. On the one hand, relapse rates were found to be high, while on the other, a considerable proportion of treated clients were abstinent for significant periods after leaving treatment.

Maturation Hypothesis

It was during this early period that Winick (40) advanced the maturation hypothesis. Winick studied some 7,200 addicts who were reported to the Federal Bureau of Narcotics during 1955 and were removed from the active file at the end of 1960 because they had not been reported again. He equated transfer to the inactive file with cessation of addiction and concluded that about two-thirds of addicts eventually became abstinent, many of them in their thirties. He then hypothesized that most addicts tend to mature out of addiction by age 40.

Ball and Snarr (3) tested the maturation hypothesis during 1962-64 by interviewing 108 residents of Puerto Rico who had been admitted to Lexington between 1935 and 1962 and subsequently discharged. The subjects were interviewed at a mean age of 33 and an average 13 years after the onset of their opioid addiction. Ball and Snarr found that two-thirds of them had been continuously addicted or in prison during the 3 years immediately prior to the time of interview. Fourteen percent had been off opioids for 1 or 2 of the 3 years; 21 percent had been abstinent during that period and were considered cured.

On the basis of their own findings, and those of O'Donnell (19) and Vaillant (38), Ball and Snarr concluded that 20 percent to 40 percent of opioid addicts apparently become permanently abstinent by age 40. They saw two major patterns: about two-thirds of addicts sink increasingly into drug dependence and a nonproductive or criminal career; about one-third abandon opioids and resume a normal life. The latter group, Ball and Snarr believed, may be said to mature out of addiction.

Vaillant (38) concluded from his own and O'Donnell's work that, although abstinence increased with time, addicts rarely became voluntarily abstinent, as by maturing out or simply being motivated to stop. He thought it more likely that abstinence resulted from loss of source of supply, external coercion, or provision of a substitute for addiction, such as alcohol, religion, or the formation of a close personal relationship. The results of early studies of the maturation hypothesis on the whole were inconclusive. It seems likely that some individuals do eventually mature out of addiction, but the fact that large numbers reenter treatment during the course of their addict careers indicates that maturation alone may be sufficient for only a very limited part of the drug-abusing population. As recently as 1979 Harrington and Cox (13) found little or no support for the maturation hypothesis based on a 20-year followup of 51 addicts in a southwestern city. Of these 51, only 1 was found to be abstinent, with the others still addicted, in prison, or deceased. Thus, the maturation hypothesis remains an open question and a subject for further study.

CONTEMPARY FINDINGS OF TREATMENT EFFECTIVENESS RESEARCH

The material that follows is not intended to be comprehensive, but rather to highlight the significant points of major evaluative studies conducted during the past decade. It focuses on the effectiveness of the four most common modes of treatment in terms of the three generally accepted criteria: drug use, criminality, and productive activity. Studies that deal with only one mode of treatment are grouped under the appropriate heading such as "Therapeutic Communities," "Methadone Maintenance," etc. Those that deal with more than one mode of treatment appear under the heading "Studies Involving More Than One Modality."

Therapeutic Communities

During the past 10 years, the therapeutic community has been one of the major means of treating drug dependency. Representative followup studies have documented the effectiveness of this modality for clients who become significantly invested in treatment whether they are opioid addicts or users of nonopioid drugs primarily; however, the attrition rate for this type of program tends to be high. For example, the latest available figures for such programs show some 34 percent of clients terminating treatment within 2 weeks after admission, a figure several times that of methadone maintenance or outpatient drug-free programs (18).

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The research outlined below indicates that perhaps two-thirds of the individuals who complete the prescribed treatment in a therapeutic community can be expected to be doing well a year or more after leaving treatment. Such individuals have been found to be free of drugs, or at least of opioids, and to be functioning acceptably in the community. The evidence shows also that the longer clients stay in treatment, the better they tend to perform after leaving treatment. Similarly, patients who complete treatment tend to do better afterward than those who leave before completing treatment (2,8,32). The high dropout rate during the early weeks of treatment suggests that those who remain in treatment are in some ways a "select" group, perhaps with greater potential to benefit from treatment. Some may argue that self-selection factors may partially account for the dramatic improvement seen in therapeutic community clients who remain in treatment for long periods of time. However, it should be borne in mind that the therapeutic community is normally a program requiring extended time in treatment and, therefore, those who make the investment of time in the program would be expected to have better outcomes.

Collier and Hijazi (5) followed up 204 former residents of Daytop Village, a drug-free, residential therapeutic community in New York City. They conducted the study, which included interviews, from April 1971 to December 1972. The primary drug used by all subjects when they entered the program had been heroin. At followup, the subjects were evaluated in part for use of drugs, illegal activities, and productive activities such as holding a job or attending school.

Of the 204 subjects in the study, 126 had completed the full 20 months of treatment and had been out of treatment for at least 6 months at the time of interview. The 78 subjects who had not completed treatment had been in the program at least 6 months and had been out of it for at least 6 months at the time of interview. For those who completed treatment, average time in Daytop was 22 months, and average time released by the time of initial followup was 11.8 months. For those who dropped out, average time in Daytop was 13 months and average time released was 11.6 months.

At followup, 84 percent of the subjects who had completed treatment were not using drugs, had not been arrested, and were employed and/or furthering their educations. The remaining 16 percent showed some infrequent use of drugs, primarily marijuana, some unemployment, and some arrests; their functioning at least was improved over that shown when they entered treatment. Of the subjects who had not completed treatment, 46 percent were not using drugs, had not been arrested, and were employed and/or involved in school. However, 19 percent had clearly relapsed to frequent drug use, serious criminal involvement, and unemployment. The remaining 35 percent were evaluated only as using marijuana infrequently.

Among both those who completed treatment and those who dropped out, the best performers tended to be older--25 to 30. Clients who stayed in treatment from 12 to 18 months had favorable followup results.

Pin, Martin, and Walsh (22) evaluated the effects of treatment at the Horizon Project, a program in New York City which provided both therapeutic community and drug-free day care programs (the program is no longer operating). All clients had been heroin addicts upon entry into treatment. The study was conducted between January 1971 and December 1973. The measures of effectiveness were abstention from drugs (heroin, cocaine, or methadone), holding a job or attending school, and remaining free of arrest.

At the time of interview, some 164 subjects, including some who had been in treatment only a few days or weeks, had been out of treatment and on their own for at least a year. Of these, 70 percent were abstaining from drugs, 64 percent had a job or were in school, and 65 percent had not been arrested.

Pin et al. found also that success was related to time in treatment. Of persons treated 3 months or less, 75 percent were back on drugs (heroin, cocaine, or methadone), 55 percent were jobless, and 57 percent had been arrested. Of those in treatment more than a year, only 4 percent had returned to drugs, 7 percent were jobless, and 23 percent had been arrested. In addition, an arrest index was devised to compare arrest records before and after treatment. For subjects treated less than a year, the index was about the same for the followup period as before treatment. For those in treatment a year or more, the index indicated a sharp decline in arrests during the followup period.

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In a later study DeLeon (8) conducted a followup of two groups of clients treated at Phoenix House, a New York City therapeutic community which is one of the largest in the Nation. In this study some 250 clients who were in residence in 1974 were followed up 2 years after admission to treatment, and 240 clients in residence at Phoenix House during 1970-71 were followed up 5 years later. Among the 1970-71 residents, 31 percent completed treatment with the remainder leaving prior to completion. More than 80 percent of the 1970-71 residents were opioid addicts compared to 54 percent of the 1974 residents. Thus, the sample included abusers of nonopioid drugs as well as those using opioids.

For each of the these two followup samples, DeLeon used an index of outcome success based on measures in three areas of posttreatment behavior. Scores were developed for drug use, criminality, and employment.

Among the 2-year followup group, DeLeon found significant improvement over pretreatment behavior. At the end of 2 years, 68 percent of the subjects who had completed treatment and 39 percent of the dropouts were doing well in terms of the outcome indices. The longer the time in treatment, the greater the improvement. More than two-thirds of the entire group displayed improved functioning posttreatment; in terms of the success indices most of the improvement was due to reduction in criminality.

Among the 5-year followup group, more than 90 percent of those who had completed treatment were doing well in terms of the outcome index 1 year later, and 76.4 percent maintained that improved status throughout the entire followup period. More than a third of all dropouts did well on the index over all years of followup. There was relatively little decline in overall improvement between the first and last years out of treatment. As previously observed, progress tended to be greater for patients who had remained longer in treatment.

In addition to the behavioral measurements, DeLeon assessed the 2-year followup group in terms of psychological criteria. He did so because the therapeutic community approach assumes that addiction reflects personality difficulties and is designed to correct them. The 2-year group had been given a battery of psychological tests upon entering treatment, and these were readministered as part of the followup interview. Psychological tests administered to these clients at entry detected signs of dysfunction. In particular, scores on scales of self-esteem, anxiety, depression, and overall social and psychological adjustment were at variance with the norm. Tests at followup showed significant improvement in psychological status (in terms of these test scores) which appears to be a function of treatment, and this improvement corresponded closely with the behavioral changes (i.e., drug use, criminality, and employment). The greatest progress was found among people who had completed treatment and the longer staying dropouts.

Thus, the several studies reviewed here provide indications that considerable improvement in functioning is derived by clients in therapeutic community treatment. The percentage of clients completing treatment who were abstinent from drugs at followup ranged from 68 to 84 percent, while improvement was found even among those who had not completed treatment. Some 39 percent of clients in one study who had not completed treatment were abstinent from drugs 1 year after leaving treatment. Marked improvement was also observed in terms of employment and reduction of criminality.

Methadone Maintenance

Methadone maintenance, as noted previously, is a major treatment modality for heroin addicts. For those who remain in treatment, various studies have shown drastic reduction and often elimination of heroin use within a year or so of admission. Increases in rates of employment have been reported, as well as sharp declines in criminality and often its cessation in individual cases. Studies cited below generally support the argument that clients who remain in treatment for longer periods of time generally fare much better than those who leave after relatively short periods of treatment.

A persistent question is whether addicts should remain on methadone indefinitely or attempt at some point to detoxify. Dole and Nyswander (7) have argued that methadone maintenance can facilitate social rehabilitation, but does not prevent opioid abuse after treatment is discontinued, nor does social rehabilitation guarantee freedom from relapse. For people with a pretreatment history of several years of addiction and social problems, they held, the soundest course was continued methadone

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maintenance with emphasis on social rehabilitation. They believed that in the case of younger clients with short histories of heroin use, a properly managed course of detoxification might be indicated.

An important aspect of methadone maintenance treatment is the size of dose administered. The optimum dose maximizes the useful actions of methadone while minimizing its side effects (e.g., drowsiness, constipation, etc.), improves program efficiency, and helps to avoid the hazards of excessive take-home doses.

The dosage question was investigated by Goldstein and Judson (12) in a 27-week experiment with 3 groups of 40 patients each. The methadone doses tested were 40, 80, and 160 milligrams daily. These investigators found that 160 milligrams of methadone daily had no advantage over 80 milligrams, but that 40 milligrams was too low and that 50 milligrams appeared to be an optimal standard daily dose. However, they were careful to point out that the dose for each patient should be determined individually in accordance with their needs. Other researchers have observed that patients with long addiction histories might require higher doses while patients with short addiction histories should be started on low dose (30-50 mg. daily) treatment. Other researchers have addressed the dosage question. Ling et al. (16) have similarly stressed the need for determining individually the dosage requirements for each client.

Significant benefits from methadone maintenance were found by Gearing, D'Amico, and Thompson (11) in a 10-year review of methadone maintenance treatment in the greater New York City area. Gearing et al. reported that of 64,370 patients who first entered methadone maintenance treatment during 1964-74, some 61 percent were in treatment as of December 31, 1974; among a sample of 1,345 patients in methadone maintenance who first entered treatment during 1964-68, 62 percent were in treatment at the end of 1974. Of these 1,345 clients, 48 percent had been in treatment continuously since their first admission to methadone maintenance.

Gearing et al. also found marked declines in reported arrests. Among patients in treatment, 85 percent of the clients experienced no arrest during treatment. Moreover, there was a general decline in arrest rates with increasing time in treatment. Improvement in productive activity was also noted with increasing time in methadone maintenance. Among a sample of those entering treatment in 1972, the percent engaged in productive activity (i.e., employment, job training, or school attendance) increased from 28 percent to 36 percent during the first year of treatment. Among those who had been in treatment 5 years, the percentage engaged in productive activity increased from 38 percent at admission to 63 percent 5 years post-admission. Thus, Gearing et al. found that clients in methadone maintenance treatment generally fared well with regard to both arrest and productive activity.

The impact of methadone maintenance also was shown by Dole and Joseph (6) in a study of 1,413 opioid addicts first admitted to treatment in the New York City area in 1966-67 and 1972. The performance of these subjects was rated at the end of 1976. At that time, 40 percent of them had been in treatment continuously since admittance, and 60 percent had been discharged. The average time of continuous treatment since admittance was 6 years, and 18 percent of all subjects had been in treatment for 10 years or more.

At followup, Dole and Joseph found sharp improvement in the social functioning of the 40 percent of all patients who had remained in treatment continuously since first admitted. Reported serious use of illicit opioids (more than twice weekly) had fallen from 100 percent before treatment to 1 percent during the last 3 months of 1976. The rate of arrest for all causes had fallen from 90 per 100 person years before treatment to 5 per 100 person years during all of 1976. These patients in general were doing well, and this was especially true of those who had remained in treatment continuously for 10 years or more.

The 60 percent of all subjects who had been discharged were found to be functioning markedly less well than those who had remained in treatment continuously. Serious use of illicit opioids (during the 3-month rating period) was reported by 64 percent of this group as opposed to 1 percent of the subjects who remained in treatment. Only 8 percent of the discharged group denied using illicit opioids and had no other problems, such as alcoholism, use of nonopioid drugs, and criminality leading to arrest during the rating period. The corresponding figure

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was 63 percent among patients who had remained in treatment. The performance of the discharged patients did demonstrate that the longer the time in treatment, the better the outcome is likely to be. Those who were doing the worst had an average of 17 months in treatment; those who were doing the best had an average of 47 months.

Maddux and McDonald (17) studied the effects of methadone maintenance among 100 heroin addicts admitted to treatment at the San Antonio (Texas) State Hospital during February-June 1970. The followup period was 1 year from date of admission for each subject. The measures of performance were heroin use, employment, and recorded arrests.

At the 1-year point, 78 percent of the subjects were on methadone maintenance. Of these 78 subjects, 74 had been in treatment continuously since admittance, and 4 had left but returned to treatment by the end of the year. Four of the remaining 22 subjects were using heroin; 10 were incarcerated or hospitalized; 3 were voluntarily abstinent; 1 had died, and the status of 4 was unknown.

All subjects were considered physically dependent at admission except one who was admitted from jail. Urine specimens were taken and tested for heroin at random intervals so long as the subjects continued on methadone maintenance. Of a total of 2,690 such tests, only 9 percent were positive for heroin. Seventy-seven percent of the subjects in treatment had at least one positive urine test during the year, but only 15 percent had five or more positive tests. Employment status was recorded at two points: admission and 1 year later. Subjects were classified as employed if they were working for pay or were engaged in homemaking or full-time education or training. On this basis, employment status for the 100 clients rose from 21 percent at admission to 65 percent at the 1-year point. Twenty percent of the subjects were classified as unemployed, 10 percent were incarcerated or hospitalized, and the status of 4 percent could not be determined. The remaining subject died during the study.

Total arrests recorded for the 100 subjects declined from 129 during the year before admission to treatment to 103 during the year after admission. Maddux and McDonald found this 20 percent decline unexpectedly small. They speculated that criminality related to heroin distribution may in fact have declined markedly and that the high arrest frequency both before and after admission to treatment reflected continued police surveillance of known lawbreakers combined with minor violations (most of the arrests were for minor violations--vagrancy, drunkenness, motor vehicle violations, and theft under $50.00.)

Stimmel et al. (36) investigated outcomes for 429 individuals who had been detoxified from the Mt. Sinai Hospital methadone maintenance and aftercare treatment program. Stimmel followed up all admissions to the Mt. Sinai methadone maintenance and aftercare treatment programs who entered March 1969 through February 28, 1976, and successfully detoxified from methadone maintenance. These clients were followed until May 31, 1977, to determine narcotic abstinence. These clients were classified on the basis of type of termination: (1) treatment completed--based on staff judgment and length of treatment; (2) voluntarily discontinued; (3) arrested; and (4) detoxified after expulsion for violation of rules.

Since most of the clients lived in the same neighborhood, it was possible for social service workers to contact them periodically after detoxification. Clients were judged to have relapsed if they had made application to a treatment program subsequent to termination, admitted drug use to the social service contact person, or produced a positive urine during the periodic followup visit. A client was considered to be abstinent if that individual produced no positive urines, and showed no outward signs of opiate use. Any verified evidence of such use was sufficient to have the individual classified as relapsed, regardless of whether that individual later became abstinent. The average followup period was 31 months.

Of the clients who completed treatment, 57 percent were abstinent during the entire followup period, while 25 percent were identified as relapses, with the rest either deceased, in jail, or status unknown. Among the voluntary detoxification group, 22 percent were narcotic free during the followup period, with 54 percent identified as using narcotics; and the remainder deceased, in jail, or status unknown. Of those detoxified because of arrest, 5 percent were narcotic free, 74 percent used narcotics, and the remainder were either in jail or status unknown.

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Among those discharged for violating rules, 13 percent remained narcotic free, 69 percent used narcotics, and the remainder were deceased, in jail, or status unknown.

The length of time in methadone maintenance was an important determinant of outcome, with 14 percent of those in treatment less than 12 months found to be abstinent compared with 21 percent of those in treatment 1 to 2 years; 33 percent, 2 to 3 years; and 40 percent of those in treatment more than 3 years.

Stimmel et al. believed their results showed that some people can detoxify from methadone and remain abstinent for prolonged periods. However, they stressed that detoxification, where indicated, must be well planned and adjusted to the individual's needs. The single most important factor in predicting the ability of a person to remain abstinent, they emphasized, was the consensus of treatment professionals that the full benefit of methadone maintenance had been realized.

In all studies, significant improvement in the functioning of methadone maintenance clients was noted. Among those who had remained in treatment for a period of several years and among those who were still in treatment, particularly dramatic reductions in illicit opioid use were noted. The improvement in illicit drug use was accompanied by a dramatic reduction in arrests (except in the Maddux & McDonald study where the decline in arrests was less dramatic) and improvement in employment status. Thus, methadone maintenance has been clearly shown to be associated with significant numbers of clients achieving high rates of abstinence from illicit drugs, obtaining dramatic increases in employment, and demonstrating significant reduction in criminal behavior.

Outpatient Drug-Free Programs

Outpatient drug-free programs serve a variety of client populations. They may serve abusers of opioid drugs, nonopioid drugs, or both. Some programs are targeted on the youthful, nonopioid abuser, and others accept clients of all ages. Counseling is the backbone of most outpatient drug-free programs, but, as noted earlier, they may vary widely in content and intended duration.

Such programs can also be useful as a means of transition to the community for people completing more intensive treatment and for evaluating the needs of people in treatment for the first time or after relapse from earlier treatment. Research by Sells, Demaree, and Hornick (28) raised the question of whether outpatient drug-free programs might be less effective for opioid addicts than other forms of treatment, but subsequent research by Simpson, Savage, and Sells (35) found that outpatient drug-free treatment could be effective for both opioid addicts and abusers of other drugs. The impact of the outpatient drug-free modality has been described by Kleber and Slobetz (15). In general, treatment followup studies focusing exclusively on this modality appear to be relatively scarce in the literature. Such studies are far more frequently found as a part of multimodality evaluations. Consequently, the reader will find this modality addressed at some length in the section "Studies Involving More Than One Modality."

Detoxification

Detoxification by inpatient or outpatient treatment for up to 21 days, using methadone or other medication has proved highly successful in eliminating physiological dependence on narcotics. Detoxification, as previously stated, offers a humane method to wean addicts from narcotics and thus to provide a respite from the hazards and stresses of drug-abusing lifestyles. However, the relapse rate of clients who undergo detoxification only is high (in one followup study, 54 percent returned to daily opioid use during the first year after treatment, and 68 percent returned to some opioid use (34)). Thus, it is appropriate to attempt recruitment of detoxification clients into longer-term treatment and rehabilitation programs. In addition to offering humane, generally short-term relief to the individual, detoxification can be useful in recruiting otherwise unreachable addicts and introducing them to longer term treatment (25). However, of all the clients who left NIDA-funded outpatient detoxification treatment during 1979, the reason for discharge for only 12 percent was given as "transferred/referred" to other treatment.

Studies Involving More Than One Modality

The material in this section covers studies of different groups of clients undergoing different types of drug abuse treatment. The results of such studies offer some opportunity to assess the effectiveness of different types of treatment.

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Bale et al. (1) investigated the effectiveness of therapeutic communities and methadone maintenance in a study involving 585 heroin addicted male veterans. Treatment facilities for the study were connected with the Palo Alto Veterans Administration Hospital. Each of the 585 subjects was admitted during an 18-month period in 1972-73. All subjects were using heroin daily upon entering a detoxification ward, and only about 20 percent were working or in school.

Of the 585 clients, 128 indicated that they were not interested in treatment other than detoxification at that time. These "detoxification only" clients were retained in the study as a comparison group. The remaining 457 clients were assigned to methadone maintenance or one of three therapeutic community programs at the V.A. hospital using random assignment of eligible clients. However, of the 457 clients available for this study, only 244 were eligible under Food and Drug Administration regulations for methadone maintenance, and thus the only possible random assignment for the remainder of the clients was to one of the three therapeutic community programs at the hospital. The 244 clients who were eligible for methadone maintenance were randomly assigned to either the methadone maintenance unit or one of the three therapeutic communities. Over time, about 10 percent of the clients who were not originally eligible for methadone maintenance relapsed, became eligible, and entered the methadone maintenance program.

Of the 457 assigned clients, 113 left and enrolled in community-based treatment programs outside the V.A. system. Of the clients assigned to methadone maintenance, only about 30 percent remained in the V.A. methadone maintenance program, while some 21 percent enrolled in one of the therapeutic communities at the V.A. hospital. Of those assigned to therapeutic communities, about 12 percent entered methadone maintenance. Overall, some 35 percent of the clients entered the treatment modality to which they were assigned. Retention at 1-year followup for therapeutic communities was the same as that experienced by the methadone maintenance program. Thus, the intent to randomize clients into treatment conditions for comparison of outcomes was undermined by (1) ineligibility of about half the 457 available clients for methadone maintenance, (2) the decision by about one-fourth of the 457 clients to leave the V.A. treatment program, (3) the fact that only about 35 percent of the clients who were randomly assigned to therapeutic community or methadone maintenance programs entered the modality to which they were assigned, and (4) the high attrition and crossover rates experienced by the two modalities.

Among other measures, Bale et al. computed a composite score for each subject at 1-year followup. The score included 1 point each for having used no heroin in the previous month (prior to followup interview), having used no other illegal drugs during the previous month, having no convictions during the year, and being in school or working at 1 year. On this basis, the maximum possible composite score was 4.

The composite scores indicated that subjects who had spent less than 50 days in a therapeutic community were doing no better at 1 year than the no-treatment ("detoxification only") comparison group. However, the methadone maintenance and longer term (50 days or more) therapeutic community groups had significantly higher composite scores than the no-treatment comparison group. More than half of the methadone maintenance group and more than 60 percent of the longer term therapeutic community group had scores of 3 or the maximum of 4. Preliminary results from a later 2-year followup (2) showed that the methadone maintenance and longer term therapeutic community groups were doing about the same in terms of composite scores, and that both were doing significantly better than the no-treatment group. Thus, while the design of the study was flawed by selective factors, clients in the longer-term modalities did appear to experience significantly greater improvement than the no-treatment comparison groups.

Burt Associates, Inc., (4) assessed the experiences of subjects who had contact with and/or received drug abuse treatment from programs of the Addiction Services Agency (ASA) in New York City and the Narcotics Treatment Administration (NTA) in Washington, D.C. The study of the Addiction Services Agency involved persons who had been enrolled in or had entered treatment during the latter half of 1971. Interviews were conducted with 462 subjects: 142 from 3 methadone maintenance programs; 185 from 4 residential therapeutic communities; and 135 from 7

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outpatient drug-free counseling programs. A comparison group comprised 118 subjects who had been in treatment 5 days or less. The interviews were conducted from August 1974 through April 1975. By then, all interviewees had been out of their original programs more than 3 years.

The study of the Narcotics Treatment Administration involved persons who had entered and left treatment during 1971-73. Interviews were conducted with 189 subjects: 93 from methadone maintenance programs and 96 from "abstinence" programs. The latter were defined to include methadone detoxification as well as drug-free regimens, but the great majority of abstinence subjects were from prolonged (in excess of 21 days) methadone detoxification programs. The comparison group was made up of 100 individuals who had left treatment within 5 days of admission. Interviews were conducted from August 1974 through January 1975. Clients had been out of treatment from 1 to 3 years at the time of interview.

Both the ASA and NTA studies involved comparisons of subjects' performance during the 2 months before entering treatment, the 2 months immediately following treatment, and the 2 months prior to the followup interview. A subject was defined as fully recovered if, during the 2 months before interview, he or she was using no illicit drugs except marijuana; had not been arrested or incarcerated; and was employed, keeping house, in school, or in vocational training. Failures were defined as subjects who were using an illicit drug daily or were incarcerated. Between these extremes of success and failure were seven levels of partial and marginal recovery.

Of the ASA subjects, 49 percent were fully recovered, 7 percent were failures, and 44 percent were either partially or marginally recovered. About 82 percent achieved either full or partial recovery. There were no meaningful differences in degree of recovery between the therapeutic community, methadone maintenance, and comparison groups.

Of the NTA subjects, 22 percent were fully recovered, 20 percent were failures, and 58 percent were either partially or marginally recovered. Some 57 percent achieved full or partial recovery. There were no significant differences in degree of recovery among the methadone maintenance, abstinence, and comparison groups.

The improvements in behavior found in these two studies were relatively large. Moreover, they seemed to be unrelated to the background or other characteristics of the subjects or, indeed, to type of treatment, including essentially no treatment in the case of the comparison groups. The fact that the comparison group also experienced significant improvements in outcomes may reflect the significant extent of reentry into treatment (about 50 percent) after initially dropping out. This is always a risk with "untreated" comparison groups constituted from clients who left treatment early. The comparison groups, therefore, were not truly minimum treatment groups.

Burt Associates also considered the possibility that maturation might have been at least partially responsible for the relatively large improvements in behavior found among all groups in the study. However, the ASA data provided no way to test such a hypothesis of maturation, and the NTA data did not appear to support it.

Burt Associates' results clearly suggest that some drug abusers are able to experience remission without formal treatment. While the Burt study demonstrates significant improvement with regard to drug use and other measures of outcome, the fact that those in the comparison group experienced improvement points up the complexity of the problem. Subsequent research under the Drug Abuse Reporting Program (DARP), which will be presented later in this report, used larger samples and found significant differences in the degree of improvement experienced by treated clients compared to untreated clients.

Results of a study of drug abuse treatment of veterans were reported by the Veterans Administration (37) which assessed the performance of more than 2,600 drug abusers admitted to 49 of its treatment centers between July and December 1973. Followup data were obtained at 11 months and at 44 months after admission to treatment for 1,182 subjects and at 44 months only for 1,471.

Treatment received was characterized primarily in terms of its duration. The median duration of treatment for the 44-month followup was 6.6 months. One quarter of the 44-month subjects were in treatment at followup, and half had undergone treatment more than once during the 44 months. Self-reported types of treatment were: detoxification, 92 percent; methadone

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maintenance, 54 percent; therapeutic community, 35 percent; outpatient drug free, 28 percent; and outpatient on medication other than methadone, 14 percent. Many of the respondents had entered more than one modality. At the 44-month followup, 75 percent of the subjects were using no nonprescribed drug other than marijuana or alcohol to intoxication; 65 percent were self-supporting; 97 percent had stable living arrangements; and 76 percent had not been arrested in the 6 months immediately prior to followup. Compared with status at admission, use of heroin had declined substantially at the 44-month followup, and use of a number of other drugs had declined significantly. The proportion of clients who were self-supporting had risen 20 percent. No sizable change had occurred in the percentages of subjects using marijuana or alcohol to intoxication.

The Veterans Administration found that the improvements in drug use and self-support had occurred largely between admission and 11-month followup. However, average number of arrests, stability of living conditions, medical problems, and interpersonal difficulties, which had changed little by 11-month followup, improved significantly by 44-month followup. These results were presented for the treatment sample as a whole and were not presented by treatment modality.

The largest national drug abuse treatment followup survey conducted to date has been carried out by the Texas Christian University's Institute of Behavioral Research, using a treatment population of some 44,000 clients admitted to the Drug Abuse Reporting Program (DARP) during 1969-73. The Drug Abuse Reporting Program is a client information and tracking system which was established under the sponsorship of the National Institute of Mental Health in 1968 and later transferred to the National Institute on Drug Abuse. The DARP system included data on clients treated in 52 programs throughout the United States, including an intake interview, and periodic client status reports. Four major modalities--methadone maintenance, therapeutic community, outpatient drug-free treatment and outpatient detoxification were included, as well as a category of clients termed "intake only" (individuals who were interviewed at intake but never actually reported for treatment). The "intake only" group was retained in the DARP population to provide for a minimum treatment comparison group in later followup studies. The concept, methodology, and distribution of client characteristics are contained in a series of books and other publications (23 through 35).

A series of treatment outcome studies were conducted using followup samples drawn from the DARP population. Representative samples of clients were obtained and interviewed some 4 to 6 years after leaving treatment. The samples included the four treatment modalities previously mentioned and the "intake only" comparison group.

A total of 3,131 clients admitted to DARP treatment during 1969 through mid-1972 were interviewed and data on drug use, employment, and arrests analyzed. The sample included both black and white clients as well as males and females. Data on drug use were obtained for the 2 months immediately prior to intake, data on employment obtained for the same 2-month period, and lifetime arrest data (in terms of whether the individual had ever been arrested) from admission records; followup data for each year of the followup period were obtained retrospectively from interview data.

Among 1,483 methadone maintenance clients, the percent using opioids daily declined from 88 percent at admission to 36 percent during the first year after leaving treatment, and declined further to 23 percent during the third year after leaving treatment. Of 845 therapeutic community clients, the percentage using opioids daily declined from 61 percent at admission to 30 percent during the first year after treatment and to 18 percent during the third year after treatment termination. Among 414 outpatient drug-free treatment clients, the percent using opioids daily declined from 43 percent at admission to 27 percent during the first year after leaving treatment and 18 percent during the third year. For 230 outpatient detoxification clients, the percent using opioids daily declined from 80 percent at admission to 54 percent during the first year after leaving treatment and 28 percent during the third year after treatment. For the same client sample, 95 percent* of methadone

* This apparent discrepancy (i.e., less than 100 percent using opioids at admission) is thought by the authors to reflect a small percentage of eligible methadone maintenance clients who were not using opioids during the 2 months prior to admission because they were hospitalized, incarcerated, or enrolled in another treatment program during the pre-DARP admission period.

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maintenance clients were using any opioids at admission compared to 53 percent during the first year after treatment. Among therapeutic community clients, 83 percent were using any opioids at admission compared to 49 percent during the first year after treatment. Among drug free outpatient clients using any opioids, the percentage declined from 61 percent at admission to 47 percent during the first year after treatment. Among detoxification clients, the percentage using any opioids declined from 92 percent at admission to 68 percent during the first year after treatment.

The percent of these clients using any nonopioid drugs (except marijuana) was also examined. Among methadone maintenance clients, the percentage declined from 50 percent at admission to 34 percent during the first year after treatment; among therapeutic community clients, the percentage declined from 65 percent at admission to 39 percent during the first year after treatment; among outpatient drug-free clients, the percentage declined from 62 percent at admission to 44 percent during the first year after treatment; and for outpatient detoxification, the percentage declined from 54 percent at admission to 47 percent during the first year after treatment.

Among methadone maintenance clients, 82 percent had been arrested at some time prior to admission compared to 19 percent during the first year after leaving treatment; among therapeutic community clients, 88 percent had been arrested at some time prior to admission compared to 22 percent during the first year after leaving treatment; of the outpatient drug-free clients, 74 percent had been arrested sometime prior to admission compared to 19 percent during the first year after treatment; and of the outpatient detoxification clients, 77 percent had been arrested at some time prior to admission compared to 29 percent during the first year after leaving treatment.

Regarding employment, the following comparisons were noted. Among methadone maintenance clients, 39 percent were employed at admission compared to 62 percent during the first year after leaving treatment; among therapeutic community clients, 34 percent were employed at admission compared to 75 percent during the first year after leaving treatment; of outpatient drug-free clients, 37 percent were employed at admission compared to 68 percent during the first year after treatment termination; and among outpatient detoxification clients, 38 percent were employed at admission compared to 57 percent during the first year after treatment (34).

The data presented above shows dramatic improvement in the drug use patterns and social functioning of a large national sample of clients treated in community-based drug abuse programs. Especially in the treatment modalities of longer duration--methadone maintenance, therapeutic community, and outpatient drug free--it is highly plausible that a large part of the improvement resulted from treatment received. That is, the improvement was so striking that the prudent individual would find it difficult to believe that an untreated control group of drug dependent persons could do nearly as well, and that the improvement therefore is unlikely to result merely from the normal course of events.

Using the data on the sample of 1,496 clients admitted to treatment during 1972-73, Simpson examined patterns of treatment outcome in relation to time in treatment (32). He used an overall outcome score based on drug use (opioid and nonopioid), employment, and criminal behavior, and found that among clients spending more than 90 days in treatment, the outcomes improved directly with increasing time in treatment. In other words, there was a linear relationship between time in treatment and favorability of treatment outcomes. This was true regardless of the modality in which the client was enrolled, and regardless of the client's type of drug use (i.e., opioid or nonopioid). In addition, clients who were judged to have completed treatment had better outcomes than those who spent the same length of time in treatment but were discharged for reasons other than treatment completion.

CONCLUSION

This report has presented some of the major findings of drug abuse treatment effectiveness research. Generally, the findings tend to support the contention that community-based drug abuse treatment in the principal three modalities--methadone maintenance, therapeutic community and outpatient drug-free programs--has been instrumental in the rehabilitation of significant numbers of drug dependent

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individuals and the helping of drug dependent persons to undertake useful and productive lives. The effectiveness of drug abuse treatment is seen in post-treatment cessation/reduction of illicit drug use, improvement in employment status, and curtailment of criminal behavior by drug abusers. While the usefulness of detoxification programs is recognized in terms of providing a humane avenue for relieving physiological dependence on drugs, this modality is not considered generally effective over the longer term and, therefore, efforts to recruit detoxification clients into other modalities should be given proper attention.

For the reader's convenience, major findings of studies presented in the "Contemporary Findings" section of this report are briefly presented in figure 1.

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Figure 1

MAJOR FINDINGS OF SELECTED TREATMENT OUTCOME STUDIES

Researchers	Major Findings
Collier and Hijazi (1974)	84% completing therapeutic community treatment abstinent from drugs; 46% of those not completing treatment but in the program for at least 6 months were abstinent at followup.
Pin, Martin, and Walsh (1976)	70% of therapeutic community clients abstinent at followup.
DeLeon (1979)	2-year followup: 68% of those completing therapeutic community treatment had favorable outcome scores; 39% of those not completing treatment had favorable outcome scores. 5-year followup: 90% of those completing therapeutic community treatment had favorable outcome scores; more than 1/3 of those not completing treatment had favorable outcome scores.
Gearing, D'Amico, and Thompson (1975)	Dramatic improvement in employment and arrest rates for clients in methadone maintenance.
Dole and Joseph (1978)	Dramatic improvements in arrest rates and virtually no serious use of illicit opioids among clients remaining continuously in methadone maintenance.
Maddux and McDonald (1973)	85% of clients remaining in methadone maintenance for 1 year: had fewer than 5 drug positive (weekly) urine specimens; dramatic increase in employment rates; and 20% decline in arrests rates.
Stimmel et al. (1978)	57% of clients completing methadone maintenance remained abstinent for the entire followup period (average 31 months) after treatment.
Bale et al. (1980)	More than half those in methadone maintenance or long-term therapeutic community programs had favorable scores on outcome index.
Burt Associates, Inc. (1977)	New York clients: 49% were "fully recovered" and 44% either "marginally or partially recovered." Washington, D.C. clients: 22% were "fully recovered" while 58% were either "partially or marginally recovered."
Veterans Administration (1979)	44 months after admission to treatment, 75% were using no illicit drugs, and 65% were self-supporting.
Simpson, Savage, and Sells (1978)	Dramatic reductions from pretreatment to posttreatment in percentages using opioid or nonopioid drugs among methadone maintenance, therapeutic community, and outpatient drug-free clients; less dramatic reduction in drug use among outpatient detoxification clients. About 80% of methadone maintenance, therapeutic community and outpatient drug-free clients were not arrested during the first year after leaving treatment compared to 71% of outpatient detoxification clients. Percentage of methadone maintenance, therapeutic community and outpatient drug-free clients employed rose from about 35% pretreatment to 70% posttreatment. Less spectacular gains among outpatient detoxification clients.

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